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H. M. WHITNEY.

RESIGNATION OF H. M. WHITNEY.

The resignation of the veteran editor of the "Planters' Monthly," Mr. H. M. Whitney, marks the close of an honorable career in journalism lasting for 54 years.

Mr. Whitney came to Honolulu in 1849, having been induced to take charge of the Polynesian by Dr. Judd, whom he met in San Francisco.

Not being satisfied with the policy of the Polynesian, which he did not control, he in 1856 started the Advertiser, which he edited and published continuously until 1870, at which time he sold out to Black & Auld, as he purposed an extended trip to the States.

Returning here in 1873 he secured control of the Hawaiian Gazette, which he edited and conducted until 1878, at which time the Advertiser again came under his control, it having been purchased by the Gazette Company.

In November, 1886, Mr. Whitney took editorial charge of the "Planters' Monthly," which position he has filled continuously and acceptably up to the present number. Growing trouble with his eyes, and his doctor's orders forbidding further use of them for an indefinite period, has obliged him to give up the work in which he has taken so great an interest.

Mr. Whitney has always been an ardent promoter of agriculture in the Islands and was one of the twelve original members to organize the Royal Hawaiian Agricultural Society, whose reports have been going the rounds of the press in the States of late as new and original matter.

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THE CROP.

During the month harvesting and grinding have been steadily progressing, and the sugar has been piling up at the various ports. The island fleet has been kept busy handling the output and the average shipments per week from all ports have amounted to about 12,000 tons.

Various estimates have been made of the tonnage of the crop now coming off, and it is probably safe to say that the total production will be in the neighborhood of 390,000 tons.

The outlook for the crop of 1904 is not so encouraging as at the beginning of the planting season, and it is believed that this crop will not justify the previous expectations of the planters. The continuous cold weather of the past few months has retarded the growth of the young cane and much damage has been done by the leaf-hopper which has appeared in excessive numbers on many of the plantations. Many of the managers report great damage done to the cane, and so serious has the pest become that the planters are preparing to take active measures toward exterminating the same.

The leaf-hopper attacks the leaves of the cane and sucks its juices; the eggs are laid beneath the surface of the thicker part of the leaf, and are placed, several together, in a small chamber formed by the ovipositor of the female parent. Their position is readily identified by the scar and discoloration at the spot where the leaf has been pierced. The young which hatch from these eggs leave the chamber and feed externally, often in great numbers together, by sucking the juices of the plant.

From recent information received by Professor Perkins it would seem that this leaf-hopper is known in Queensland, but as no reports have come of any damage done to the cane there, it is probable the pest is kept down by natural enemies or that climatic conditions are not favorable to its increase.

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THE PRICE OF SUGAR.

Sugar reached its lowest point during the past month on the 7th inst. when it dropped to 3.50c, which is also the lowest point for the present year. On the ninth it was quoted at 3.51c.

The reason for the continuous drop seems briefly, to be that there is an accumulation of stock in the refiners' hands which they are obliged to store, and under pressure of the sellers to dispose of their sugars, the natural result is a decline in price.

For some time past the receipts of sugar per week, as given by the various sugar statisticians, have exceeded the meltings for the same period by about 10,000 tons. The condition of the market has made it easy to manipulate; the sellers force the sale of their sugars and the trust and other refiners buy at such prices as they see fit to pay. When all the Cuban sugar that has been held to obtain the expected benefit of reciprocity is finally disposed of, and the refiners require more sugar as the season advances, a gradual adjustment and strengthening of prices is looked for, and it is likely that we will obtain prices more nearly equivalent to those current in Europe.

The disparity between New York and London prices has been very marked, and in this connection the statements contained in the circular of March 27, issued by Czarnikow, Macdougall & Co. are of interest:

"This further decline in our raw sugar market has made the disparity between the landed cost here of cane and beets greater than ever. At to-day's quotations of 8s. 2¼d. f.o.b. beets, their cost would be equivalent to about 4c. for 96° centrifugals, and even if we eliminate the countervailing duty, their cost would equal 3.73c. for centrifugals as against our spot market of 3.62c. Therefore, if our refiners had to resort to Europe for supplies, the delivered cost of their beet purchases would be equivalent to $\frac{3}{8}$c. more than they are paying for cane sugars, and, even if we put aside the extra cost arising from the countervailing duty, this market is $\frac{1}{8}$c. below the European one, and the two markets are entirely out of harmony. This condition of affairs cannot be lasting for the international market prices of a great article of commerce, consumed in every country, must, in the long run, either rise or fall to the same level.

"If we take the two markets at this time last year and compare them with this year, the contrast between the course of the European beet market and that of the United States cane market is striking:

	March 27, 1902	March 27, 1903	Advance
Beets—Hamburg........	6s 7½d f o.b , equal 7s c.f.	8s 2¼d f.o b., equal 8s 6¾d	2s 6¾d
Centrifugals—N. Y...	3⅝c landed	3⅝c landed	Nil

This divergence between the course of the two markets will eventually effect its own cure, and a slight step has been made in this direction by recent sales which will divert Cuban sugars to the United Kingdom and to Canada, but this cannot yield effective results so long as 40,000 tons of sugar per week are pressed upon a market, whose needs are only 30,000 tons."

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We are indebted to Mr. C. Hedemann for the article on the Sugar Industry in Java, being a lecture by H. C. Prinsen Geerligs delivered at Amsterdam.

Mr. Hedemann recently returned from his trip around the world during which he gave much attention to the sugar industry in other countries, and we hope that we may soon publish some of the results of Mr. Hedemann's observations and experiences in this line.

The lecture by Prof. Geerligs is of a strictly technical nature, and the translation thereof, which was done by Mr. W. H. M. Nolet under Mr. Hedemann's direction, was a matter of much difficulty, and necessitated pains-taking work especially in giving the English equivalents for the Dutch technical terms. n

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HAWAIIAN SUGAR CHEMISTS' ASSOCIATION.

For the information of those interested in sugar work we are publishing herewith the constitution of the Hawaiian Sugar Chemists' Association, and a list of its officers and members.

That the purpose of the Association may not be misunderstood, a brief history thereof and the reason for its organization will not be inappropriate.

The lack of uniformity in methods of analysis used in the sugar mills in Hawaii, having been a matter of comment among chemists for some time; and differences in results obtained in mills, working apparently under the same conditions, having also been a matter of comment among plantation managers and agents, Mr. C. F. Eckart, Director of the Planters' Experiment Station, called a meeting of the sugar chemists of Oahu, to discuss the formation of an association to bring about, if possible, the adoption of uniform methods of analysis; and thus determine whether discrepancies in results were due to methods of work or to methods of analysis.

The meeting, which was attended by all the chemists on Oahu, was held in Honolulu October 25th, 1902; and it was the unanimous opinion that the formation of such an association was desirable.

A committee was appointed to draw up a constitution for the proposed association, and an invitation was sent to all the sugar chemists in the Territory to attend a meeting for organization November 24th, 1902. Owing to the short notice given, and the late date of the meeting, it was attended only by the chemists on Oahu; but replies were received from all to whom invitations had been sent, expressing approval of the formation of the association, and promising support of the same.

At the meeting held Nov. 24th the association was formally organized, the constitution as herein published was adopted, officers were elected and preliminary work begun by a special committee on extraction. The work of this special committee is outlined in the leaflet published in the January number "Provisional method for extraction".

Committees on Extraction, Polarization, Reports and General Control Work were appointed; and it is expected that by the time of the next annual meeting it will be possible to adopt methods covering the whole work of the sugar-house chemist.

Since the first meeting the membership has increased, there being now 29 active and 2 associate members.

Although the object of the association is explicitly stated in the constitution, viz.: "the study of sugar chemistry, and of the methods of analysis used in effecting control of sugar house work; with the aim of arriving at uniformity both of methods and statement of results," there seem to be misconceptions on several points which it may not be out of place to correct.

At the time of the organization of the Association, the daily papers gave it the name of a "union" or "combine". In this connection it is only necessary to point out that combinations or unions of chemists for the purpose of controlling or affecting compensation do not exist, and to say that this idea was not, and will not, be entertained by those instrumental in the organization of the Association.

Again the matter of official methods, i. e. the adoption of uniform methods by some association, seems not to be well understood by some. Official methods of analysis, so far as American methods are concerned, originated in 1884 in the organization of the Official Agricultural Chemists' Association formed primarily for the adoption of uniform methods for analysis of fertilizers. This Association has continued its work up to the present time, and the methods now adopted cover fertilizers, soils, fodder, foods and food adulteration. Similar lines of work have been carried on by other organizations; e. g. the International Committee for Uniform Methods of Sugar Analysis have published methods which have been subscribed to by 167 American chemists. In the United States, many large consumers of iron and steel, in contracting for supplies, not only specify the composition of the material, but also the methods by which the ingredients are to be determined; and make these methods part of the contract. Uniformity of methods of analysis in cement work is now being aimed at; and as commercial interests demand it, no doubt uniformity in other lines will be adopted.

The reason why methods should be uniform and adopted as official, by chemists working along any special line, is that no method of analysis is absolutely exact. Probably the determination of the atomic weights of the elements calls for the most exact work, and in such determinations the results are a measure of the skill, and knowledge of the operator of methods applicable to the work in hand; but no chemist looks on the recognized atomic weight of any element as absolutely exact, but simply as the nearest approach yet made to the exact figure. As a matter of fact the list of atomic weights is revised from year to year; the figures being changed as shown to be wrong by more recent work.

In commercial chemical work it is necessary to distinguish between scientific accuracy, and commercial accuracy. In the former no pains are spared, and nothing is omitted so far as known which will increase the accuracy of the results; in the latter the end aimed at is a sufficient approach to absolute accuracy to meet the commercial requirements of the work commensurate with reasonable expenditure of time and money. If the most exact methods such as are used in research work, were applied to sugar house work the necessary time and expense would be such as to prohibit all chemical work.

Some, both laymen and chemists, have put forward an argument against official methods somewhat as follows: A sugar house product, say waste molasses, contains a certain amount of sucrose, a definite substance; should not a chemist if he is competent, be able to determine absolutely the amount of sucrose present and be left to choose his own method? In answer to this it may be said that as a matter of fact, different methods are in use in making this, and almost every other determination, in sugar house work; and it is also a matter of fact, that these different methods give different results when applied to the same material; and generally arguments of more or less weight can be put forward in support of each. It is in meeting the difficulty which arises from this state of affairs, that a chemists' association finds its usefullness, and the adoption of uniform methods is, in the present state of chemical knowledge, the only solution. A method adopted by the majority of those using such methods, is pretty sure to be the best available under the circumstances; and even if it should not be the best there is the advantage that the results obtained are comparable.

The work of a chemists' association does not, however, cease with the adoption of an official method; old methods are to be studied and compared, new methods sought; and a method once adopted, may be changed later to one more accurate, but equally applicable with the time and facilities at the chemists' command.

It is easily seen then, that the statement that once a chemists' association has adopted uniform methods, its office is at an end, is untenable, unless one takes the position that knowledge of chemical methods cannot be enlarged; a position which is not true of any other branch of knowledge, and one which chemists at least do not take.

The work of the Chemists' Association in bringing about uniformity in methods of analysis and statements of results can be successful only with the co-operation of plantation managers. When the Chemists' Association is prepared to adopt methods of analysis these methods will represent the work of all the sugar chemists in the Territory, and much work outside the ordinary routine required of them; but they will be official only so far as the Chemists' Association is concerned. Any plantation management can of course refuse to adopt these methods; but the Chemists' Association has provided in its constitution for conference with the Planters' Association on this matter; and no doubt when methods are recommended, they will receive the consideration they deserve, and there will be assured to the Planters: 1. The best methods available. 2. Results which will be comparable. 3. Continuance of the work of the Chemists' Association, resulting in improvement in methods; and the stimulation of research resulting in improvements in manufacture.

With regard to the provisional method for extraction it may be said, as well as of provisional methods generally, that it was published to meet the demand for something which would furnish comparable figures, and also as a basis for committee work in aiming at a method to be finally adopted.

CONSTITUTION.

Article 1.—Name and Object.

1. The name of this Association shall be the Hawaiian Sugar Chemists' Association.
2. The object of this Association shall be the study of sugar chemistry, and of the methods of analysis used in effecting chemical control of sugar house work, with the aim of arriving at uniformity both of methods and statements of results.

Article II.—Membership.

1. There shall be two classes of members, Active and Associate.
2. Active members shall be chemists who are, or have been engaged in sugar work, either in sugar factories or in experiment station laboratories.
3. Associate members shall be any others who may be interested in the object of the Association. Associate members shall not have the privilege of voting or of holding office.
4. All who attend the first meeting or who have signified their desire to become members shall be enrolled as charter members.
5. Applicants for membership shall make written application to the Secretary, endorsed by three active members; and such application shall be voted on by the Executive Committee.
6. There shall be a yearly due of one dollar payable in advance, and any member in arrears for one year shall be dropped from the roll.

Article III.—Officers.

1. The officers of the Association shall be a President, Vice-President, Secretary-Treasurer, and an Executive Committee composed of these three with one representative each from Oahu, Maui, Hawaii and Kauai, and the Director of Experiment Station of the Planters' Association ex-officio.
2. These shall be elected at the annual meeting and shall hold office until the next annual meeting. Election shall be by ballot and the one receiving the highest number of votes shall be declared elected.
3. The duties of these officers shall be such as usually pertain to such offices in similar associations.
4. Vacancies between annual meetings shall be filled by the Executive Committee.

Article IV.—Meetings.

1. The annual meeting shall be held between October 1st and December 1st at such time as the Executive Committee shall decide.

2. Special meetings for the discussion of reports, etc., may be called by the President at any time.

Article V.—Management.

1. The whole management of the affairs of the Association, including the direction of the work of special committees, shall be in the hands of the Executive Committee.

2. The Executive Committee shall represent the Association in conference with the Planters or any other Association; and may make any rules and conduct any business, not in conflict with this constitution.

3. A majority of the Executive Committee shall constitute a quorum; and the President shall be the chairman of said committee.

4. The Executive Committee shall make a report to the Association at the annual meeting.

5. At the annual meeting the President shall appoint committees to carry on such investigations as may be deemed necessary. The number of such committees and the work each is to do shall be decided at the annual meeting, and such committees shall report from time to time to the Executive Committee.

6. No method of analysis shall be adopted as official unless it shall have been discussed at a special or annual meeting of the Association, and such method shall be adopted as official only if approved by two-thirds of those voting at said meeting.

Article VI.—Amendments.

1. Amendments to this constitution shall be made only at the annual meeting, and written notice of such proposed amendment shall be given to the Secretary at least sixty days before the earliest possible date for the annual meeting; and such notice shall be given to each member at the time of notice of such meeting.

2. Amendments shall be by two-thirds majority of those voting.

LIST OF MEMBERS.

Active Members.

Baldwin, Geo. H., Chemist, Haiku Sugar Co., Hamakuapoko, Maui.

Bett, W. P. L., Chemist, Hawaiian Commercial & Sugar Co., Puunene, Maui.
Brodie, Alex. Jr., Chemist, Kekaha Sugar Co., Kekaha, Kauai.
Cropp, Ernest, Chemist, Lihue Plantation Co., Lihue, Kauai.
Crawley, J. T., Superintendent and Chemist, Hawaiian Fertilizer Co., Honolulu.
Donald, Jas. W., Chemist, McBryde Sugar Co., Eleele, Kauai.
Eckart, C. F., Director, Experiment Station, Planters' Association, Honolulu.
Fries, A., Chemist, Hawaiian Sugar Co., Makaweli, Kauai.
Jordan, A. E., Assistant Chemist, Ewa Plantation Co., Ewa, Oahu.
Johnson, H., Chemist, Waialua Agricultural Co., Waialua, Oahu.
Krumbhaar, C. C., Chemist, Hawaiian Agricultural Co., Pahala, Hawaii.
Lea, E. J., Chemist, Honolulu Plantation Co., Aiea, Oahu.
McQuaid, W. M., Chemist, Olaa Sugar Co., Olaa, Hawaii.
Messchaert, P. A. G., Chemist, Oahu Sugar Co., Waipahu, Oahu.
Peck, S. S., Chemist, Experiment Station, Planters' Association, Honolulu.
Penny, J. C., Chemist, Ewa Plantation Co., Ewa, Oahu.
Schultz, Dr., Chemist, Pacific Guano & Fertilizer Co., Honolulu.
Shorey, E. C., Food Commissioner, Hawaii Territory, Honolulu.
Sanborn, T. E., Chemist, Makee Sugar Co., Kealia, Kauai.
Toepelmann, O., Chemist, Kahuku Plantation Co., Kahuku, Oahu.
Werthmueller, F. R., Chemist, Experiment Station, Planters' Association, Honolulu.

Associate Members.

Olding, E. E., Manager Kohala Sugar Co., Kohala, Hawaii.
Smith, G. W., President and Manager Benson, Smith & Co., Honolulu.

Officers.

President, C. F. Eckart, Honolulu; Vice-President, J. C. Penny, Ewa, Oahu; Secretary-Treasurer, E. C. Shorey, Honolulu.

Executive Committee.

C. F. Eckart, Honolulu; J. C. Penny, Ewa, Oahu; E. C. Shorey, Honolulu; P. A. G. Messchaert, Waipahu, Oahu; W. McQuaid, Olaa, Hawaii; G. H. Baldwin, Hamakuapoko, Maui; A. Fries, Makaweli, Kauai.

THE FERTILIZING VALUE OF CANE LEAVES AS INFLUENCED BY DECAY AND EXPOSURE.

C. F. Eckart.

That the nitrogen and mineral content of the cane leaf bears a certain relationship to the vigor and age of the same has been known for many years. It has been determined that not only nitrogen is lost from the leaf on the cessation of its vital functions but also that a certain decrease of other elements of a fertilizing value takes place as a result of the following decay and exposure.

In the metabolic dissociation of highly organized vegetable tissue, a large amount of nitrogen escapes as a product of fermentative and putrifactive changes, and complicated organic salts are gradually broken up into the more simple forms that characterized their condition on being assimilated by the plant. With the cane leaf these destructive alterations doubtless start with the termination of its vital activity, and on the death of the cell walls the mineral matter loses, through the diffusive action of dew and the leaching effect of rains, the proportions assumed in the normal and growing leaf.

An experiment was recently conducted at the Experiment Station to show the percentages of nitrogen, potash, and phosphoric acid that may be removed from green stripped and exposed cane leaves during a period of two months, and some interesting results were obtained bearing on the magnitude of such losses.

Six fresh and vigorous leaves, weighing in all 340 grams, were taken from Lahaina cane and each leaf was cut up into three sections of the same length. These sections will be designated as (1) the base sections, (2) the middle sections, and (3) the end sections. The base sections of the six leaves were added together to form one sample for analysis, the same being done with a like number of middle and end sections. The analytical data obtained are shown in the following tables.

Analysis of Fresh Leaves.

Percentage of Matters.

Section	Moisture	Solid Matter	Organic Matter	Mineral Matter
Base	77.92	22.08	20.54	1.54
Middle	71.54	28.46	26.50	1.96
End	62.78	37.22	34.50	2.72

Weight of Matters. Grams.

Section	Moisture	Solid Matter	Organic Matter	Mineral Matter
Base	164.41	46.59	43.34	3.25
Middle	62.24	24.76	23.05	1.71
End	23.86	14.14	13.10	1.04

Phosphoric Acid, Potash, and Nitrogen in the Fresh Leaves.

Calculated to Water-free Substance.

ELEMENTS	BASE SECTIONS Per Cent.	Wt. Grams	MIDDLE SECTIONS Per Cent.	Wt. Grams	END SECTIONS Per Cent.	Wt. Grams
Total Min. Mat.	6.97	3.25	6.90	1.71	7.32	1.04
Phosphoric Acid	.145	.067	.253	.063	.438	.062
Potash	1.840	.857	1.708	.423	.834	.118
Nitrogen	.56	.124	1.15	.327	1.46	.543

The percentages of the elements are seen to vary materially in the different sections, the proportion being smaller at the base with regard to nitrogen and phosphoric acid, and increasing toward the tip. With respect to potash, the percentage is largest at the base and falls off considerably as the end is approached. Little need be said concerning these results until others are presented for comparison further on.

At the same time the above samples were taken for analysis, six other leaves (weighing 341 grams) of the same vigor and age were laid in an open field and exposed to ordinary weathering conditions for two months (February and March). At the end of such period they were cut up into sections as in the case of the fresh leaves and analyzed. The results were as follows:

Analysis of Exposed Leaves.

Percentage of Matters.

Section	Moisture	Solid Matter	Organic Matter	Mineral Matter
Base	9.86	90.14	83.48	6.66
Middle	9.61	90.39	83.64	6.75
End	9.44	90.56	80.36	10.20

Weight of Matters. Grams.

Section	Moisture	Solid Matter	Organic Matter	Mineral Matter
Base	2.86	26.14	24.21	1.93
Middle	1.92	18.08	16.73	1.35
End..	1.13	10.87	9.65	1.22

Phosphoric Acid, Potash, and Nitrogen in the Exposed Leaves.

Calculated to Water-free Substance.

ELEMENTS	BASE SECTIONS Per Cent.	Wt. Grams	MIDDLE SECTIONS Per Cent.	Wt. Grams	END SECTIONS Per Cent.	Wt. Grams
Total Min. Mat.	7.39	1.93	7.47	1.35	11.26	1.22
Phosphoric Acid	.184	.048	.188	.034	.252	.027
Potash	.331	.086	.131	.024	.163	.018
Nitrogen	.47	.113	.79	.143	1.11	.121

In comparing the quantities of the elements in the fresh leaves with those in the exposed samples it should be remembered that two different samples are represented. These lots were as near alike, however, as it would be possible to obtain them, both being from the same cane and representating leaves of the same growth and development, the weight of one sample being 340 grams and the other 341 grams.

A glance at the last table shows the percentage of total mineral matter in the exposed leaves to have increased considerably over that in the fresh. This is explained by the difference in the content of solid matter, which decreased on exposure in a proportion greater than that in which the total mineral matter was leached from the leaves by rain. The results of the two analyses are brought together for comparison.

Comparison of Fresh and Exposed Leaves.

Percentage of Water-free Substance.

ELEMENTS	BASE SEC'S *Fresh*	*Exposed*	MIDDLE SEC'S *Fresh*	*Exposed*	END SEC'S *Fresh*	*Exposed*
Total Min. Mat.	6.97	7.39	6.90	7.47	7.32	11.26
Phosphoric Acid	.145	.184	.253	.188	.438	.252
Potash	1.840	.331	1.708	.131	.834	.163
Nitrogen	.56	.47	1.15	.79	1.46	1.11

Weight of Elements Contained in Leaves.

ELEMENTS	BASE SEC'S *Fresh*	*Exposed*	MIDDLE SEC'S *Fresh*	*Exposed*	END SEC'S *Fresh*	*Exposed*
Total Min. Mat.	3.25	1.93	1.71	1.35	1.04	1.22
Phosphoric Acid	.067	.048	.063	.034	.062	.027
Potash	.857	.086	.423	.024	.118	.018
Nitrogen	.124	.113	.327	.143	.543	.121

The data presented in the foregoing table shows that not only a large amount of nitrogen is lost through putrifactive changes but that a remarkable decrease in the potash and phosphoric acid content is effected in the course of the decomposition of the vegetable matter and the diffusive and leaching action of dew and rain.

Another table is given to show the percentage of loss of the three elements in question.

ELEMENTS	Amount in Fresh Leaxes	Amount in Fresh Leaves	Weight of Element Lost	Percentage of Loss
Potash ...	1.398 grams	.128 grams	1.270 grams	90.8
Phos. Acid	.192 grams	.109 grams	.083 grams	43.2
Nitrogen ..	.999 grams	.377 grams	.622 grams	62.2

The figures given in the preceding table can only be construed as representing a close approximation to the actual facts. The mineral content of the two lots of leaves would hardly be exactly the same, in fact the total mineral matter in the exposed end sections is seen to be a trifle higher than in the fresh end sections. Such an inconsistency is most probably due to slight differences in the composition of the respective samples; the possibility of alteration of proportions through diffusive action in the weathered leaves must also be taken into account. The losses of the several elements from the leaves taken as a whole, however, must be fairly reliable. For example a difference in the potash content, of the fresh and exposed leaves, amounting to 0.77 gram in the base sections cannot be interpreted as the result of mere accidental variation in the composition of the normal leaf samples. Nearly the same percentage of reduction in potash content is manifested with respect to both the middle and end sections. The same observations would apply to phosphoric acid and nitrogen.

The data brought together in this article show the approximate losses in nitrogen, phosphoric acid, and potash which would result from drying and exposure of leaves taken green from the cane. They indicate the changes which start in the green leaves and tops after harvesting. It is probable that if these leaves had been allowed to cease growth and wither on the stick, a certain amount of mineral matter might have returned to the stalk to be further utilized in the plant economy, as the content of certain vital elements in leaves has been observed to diminish on cessation of growth and the percentage of silica to increase.

As the potash and phosphoric acid were returned to the soil in the foregoing experiment, they cannot be considered as having been lost from an agricultural standpoint, although such was not the case with nitrogen. A considerable quantity of the latter element was thrown off into the air during the decomposition of the leaves as proper conditions were lacking for nitrification of the organic matter.

The manner in which phosphoric acid and potash were lost from the dried and partially decomposed leaves would indicate in a measure the degree of availability of these elements when applied to the soil in cane refuse.

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ENEMIES OF LANTANA.

R. C. L. Perkins.

At about the time that I last reported on the subject, I received the latest consignments of lantana destroying insects from Mr. Koebele, and these were more valuable and extensive than any of his former ones. In fact, so plentiful was the material (consisting largely of seeds) that when the insects began to hatch out it was with great difficulty that I was able to handle them without assistance.

As it was, I was unable to preserve all the specimens of the insects parasitic on the lantana destroyers, these parasites being, as before, at least fifty times more numerous than the lantana insects themselves. As the main object was, of course, to destroy these parasites, this was done; and specimens of, no doubt, most of the species were preserved, but I regret that I was not able to preserve all of these parasites for future study. However, the number of parasites of the lantana insects preserved by me probably amounts to two or three thousand examples and they are probably a fairly complete sample of those which in Mexico attack such lantana insects as have been sent to this country.

As I have remarked in my earlier report the experiment of eradicating lantana in the manner attempted, is of a novel and unique character, and it is to be hoped that at some future period the specimens preserved by Mr. Koebele in Mexico, and myself in this country, will be scientifically worked out. I believe if this can be done and the relationship of the parasites to the lantana-eating insects determined; if also the methods and devices used in transporting the various insects to this country, and information on similar subjects be published; in fact if a full report on the subject can be written, it will prove of very great value for future work.

The insects examined and handled by myself and Mr. Koebele combined, in connection with this work on lantana—that is the lantana-eating species themselves, their parasites, and the parasites of these parasites—amount to not less than two hundred species and may even be considerably more numerous, and of these, a very large percentage are new to science.

Of course, of the whole number of insects feeding on lantana in Mexico, it was quite impossible for us to use some, since they either would certainly, or at least probably, have attacked other vegetation. Such insects, even though very effective in Mexico, were never even sent to this country and consequently I have not yet seen specimens of these, nor of such parasites as may attack them.

By the middle of February, all the parasites which attack the lantana insects had been thoroughly eliminated, and I began to liberate a number of the latter in various parts of this island.

On one occasion a large number of two or three species were turned out on the Waianae side of the island, in a spot, highly favorable for their first establishment. This journey necessitated my being absent from Honolulu for one whole day, and on my return I found the insects left behind in my cages had already suffered severely from want of attention. Consequently, I have not been able to revisit the locality where these species were liberated; but as two of the same species were liberated in less numbers and under less favorable circumstances in the neighborhood of Honolulu, and have flourished, I have no doubt those on the Waianae side have done as well, if not better.

In endeavoring to establish the insects in this country, it became necessary to adopt some plan, whereby such insects as we desired to introduce might be given every chance to become established. In the case of several species, only a very few individuals reached this country alive (owing to the difficulties fully discussed in my first report)—not because Mr. Koebele did not despatch large numbers, but because nearly all died in transit or were subsequently killed by the internal parasites feeding on them, before they could reach maturity. In some cases, only a single pair of the lantana destroyer were received together. In one such case the female of the pair laid some two hundred and fifty eggs. These were kept for some time, until the resulting insects were half-grown, when nearly all the brood was liberated. The remaining specimens, however, were kept in captivity and bred to maturity in order to obtain a new supply of eggs, so that the young of this generation which were liberated probably amounted to some thousands of individuals. By such means the probability of a species becoming established is greatly increased, and it will probably be prudent to continue breeding some of the species in captivity for some generations, not only to make sure of their becoming well established in a wild state, but also for the purpose of getting large numbers together for distribution to various parts of the islands.

About the beginning of March I already noticed signs that some of the lantana insects were fully established in a state of freedom. At the present time, I have certain proof that not less than seven species have produced one or more generaations in the free state, and also that they have in some cases spread considerably from the spots where they were liberated. These species are all such as breed very quickly and may have 8 to 12 generations a year. One may certainly hope that as so many of these are satisfactorily established, a good many of the slower breeding species will likewise show up hereafter. Some of these cannot possibly become noticeable for many months under the most favorable circumstances.

For my own part I have been astonished, considering the enormous area covered by lantana and the fact that all the insects that we have imported are capable of flight, so many, or I might say, that any, should have already shown up at large.

In the course of my work, I have had many opportunities for the study of such insects as were attacking the lantana prior to the introduction of the insects specially attached to this plant, as sent by Mr. Koebele. These insects have all, or nearly all been already reported from the islands in connection with other plants, and are not especially attached to lantana. Consequently they are very ineffective, except perhaps the dangerous scale-insect (Orthezia), which first appeared on Maui and has (I think unwisely) been spread from thence.

As we have no wish that at some subsequent period it should be supposed that these insects were brought or spread through our instrumentality, I propose, at an early opportunity, to supply a list of these with records of their existence in these islands prior to Mr. Koebele's mission to Mexico.

[NOTE.—In November of last year Mr. Perkins submitted a preliminary report in which he gave the results of the work done by Prof. Koebele in Mexico in collecting and forwarding the insects known to destroy lantana in that country, and the breeding and liberating of the insects after arrival here. The work at that time was far from being finished, and as was said by Mr. Perkins, "it must of necessity be a considerable time before the results of what has already been done can be ascertained."

Under date of January 8, 1903, Mr. Perkins submitted some remarks supplementary to his report of November, in which he said:

In my former report I stated that there were some 23 lantana-destroying insects that we considered safe to liberate.

Three of these I now consider it will be almost impossible to introduce into this country, owing to the distance, and the extreme delicacy of the insects. Up to the present time 15 or 16 in all have been liberated in this country (some of these, however, are not included in the list above mentioned.)

Amongst these 15 or 16, 3 of what I should consider the very best known enemies of lantana are, I think, nearly certain to establish themselves and there is every reason to hope that 4 or 5 other good enemies of the plant will do so, while of course there is no reason why all of those liberated should not do so, except that some have been turned out only in very small numbers, and their liberation has been followed by extremely stormy weather.

Most of the species have been turned out in the neighborhood of Honolulu, but some also in the neighborhood of Waianae, which is a far more suitable locality for first establishing colonies, whence the general distribution may subsequently be made.

In addition to the lantana enemies, parasites and other insects enemies for 'peelua' and cut-worm have been liberated in greater or less numbers since my report.

Parasites for plant-lice (Aphis) on low-growing plants of pasture lands, and on vegetables were also sent over, but unfortunately these all died on the way. On opening the boxes I found hundreds of parasites still living but microscopic examination showed that these were not Aphis-destroyers, but hyper-parasites, or destroyers of the Aphis-destroyers, not one of the true Aphis parasites having survived.

I need hardly point out how important it is that such things should be carefully examined. Thus a box arrives with many obviously parasitic insects, which by the ignorant would be supposed to be beneficial and might be liberated. Yet when liberated not only would these hyper-parasites not kill the Aphis but they might attack such destroyers of Aphis as we already have.

Similarly from one lot of parasitized cut-worms sent over here not a single live true (Primary) parasite was bred. When the boxes were examined there were thousands of parasites already emerged, but all these were secondary parasites (hyper-parasites) i.e., destroyers of the true parasites of the cut-worm. Such hyper-parasites if liberated by the ignorant or rather non-specialist would probably proceed at once to attack such cut-worm and other caterpillar enemies as we already have, with disastrous results.

A close watch should be kept continuously for any signs of breeding in the species that have been liberated, for as soon as every young from these are detected, distribution of specimens should be made to the other islands. It is very advisable that the species should be established in as many localities as possible, as soon as may be, as an effective and permanent settlement is much more likely to take place by this means.]

THE SUGAR INDUSTRY IN JAVA.

Honolulu, Territory Hawaii, April 11, 1903. — The Editor, The Hawaiian Planters' Monthly, Honolulu. Dear Sir:— In complying with your request to furnish an article for the "Planters' Monthly" which would deal with some of the impressions and information I have received pertaining to the sugar industry during my recent visit to Java and other cane growing countries, I beg to state that since my return to the Islands attention to my business has not allowed me the necessary time to arrange in a presentable shape, the many notes and other material I have gathered on this trip. I think, however, that the following article from "De Indishe Mercuur" will be of much greater value and interest to our planters than anything emanating from my pen. It is a report of a lecture on the sugar industry in Java, delivered in Amsterdam during the month of January last by Mr. H. C. Prinsen Geerligs, Director of the West Java Experimental Station at Kagok. I present herewith as a contribution to your "Monthly" a translation from the Dutch of this article, and wish to mention that in transposing the terms used in Java for areas, weights and coin, I have used the following valuations:

1 Bouw=1.7534 acres	1 Ton=14.69 picols
1 Picol=136.16 lbs.	1 Florin=40 U. S. Cents

Yours faithfully, C. HEDEMANN.

The situation of the sugar industry in Java is a peculiar one and totally different to other sugar producing countries. While in most colonies planters are owners of the land, and in some instances do not plant, but merely grind the cane, the manufacturer in Java is also planter and has to plant chiefly on leased lands. With the exception of the "Vorstenlanden" (independent Sultanries) and a few companies that plant on private lands, or on long leases that last for a number of years, and by the death of the first lessee fall heir to his descendants, cane in Java is grown on land leased for only one crop at a time. In Java we cannot speak of regular sugar estates, as of the whole plantation, for the reason that the lot on which the mill is situated is the only real property and new soil to be planted has to be leased every year. This of course creates a permanent uncertainty; one is never sure of obtaining soil and even if one takes good care to have the mill and hauling system in perfect order, he is at times placed in the disagreeable position, that the native owners will not lease their land any more, or that another planter gets hold of the desired land. This latter can, however, be provided against, by making boundary regulations, which prevents one company competing with another in the leasing of soil, but it is evident, that all this is based on mutual goodwill and if one party likes to step back or an outsider comes in, no soil may be had and great efforts have to be made to get enough land for cultivation.

In the "Vorstenlanden," where the lease is mostly on longer terms the situation is far better; one is sure of his planting area and in consequence more care can be taken of, and more money invested in, permanent improvements. In the Government lands, however, a low or bad patch of land is left untilled or not leased, because if one should improve it the proprietor is apt not to re-lease it.

Another point of difference from other countries is, that in Java cane is mostly grown on irrigated land. The same soil is used for rice (Sawah) and for that purpose provided with irrigation-systems, and as it is planted with cane after the rice has been harvested, the cane planter benefits by the existing artifical water supply.

Planting is done in the dry season and water is needed to make the cane shoot and grow till the wet season takes care of this. The irrigation systems are leased with the land and are to be maintained by the lessee. On account of the great increase in planting area, the system of irrigation has lately proved insufficient and big pumping stations have been erected by various companies for irrigating the land with water pumped from the rivLers and thus rendering it fit for cane planting.

The labor question, the chief question in other countries, is not difficult to solve in Java. The generally dense population, living in the neighbourhood of the sugar estates, work for daily wages, so no imported coolies with their appendix of labor contracts, hospitals, etc., are needed to solve the labor problem in Java.

The situation may be framed in short as follows: In Java there is a minimum of expensive land, which cannot change ownership, with abundant cheap labor, while most of the other sugar producing colonies show an abundance of cheap, owned land with scarce labor. While in many other countries cultivation is carried on very extensively, in Java it has to be done very intensively, so as to get the most possible results out of the little available soil in the shortest possible time. This accounts for the great production of sugar in Java per square unit in comparison with other countries, as well as why in other countries the methods in Java are not imitated. It is not due to the land being extraordinarily favored by nature, but only to the more expensive and intensive cultivation, which elsewhere would be impracticable on account of expensive labor and is not necessary either on account of their extensive land properties. Java is not so well favored by nature; the soil is poor and if the climate did not facilitate decomposition, and the assimilation of the product of decomposition, it would not be possible to carry on agriculture. Should a European expert have to analyze Javan soil, without being properly informed, his answer would undoubtedly be, that same be classed among the most unfavorable and poorest.

The great drought prevailing during one half of the year, is also a great impediment and hampers the development of the cane to a great extent. At the same time irrigation water is less abundant and may even fail entirely.

We are finally forced by the Sereh-disease, which we can partially protect ourselves against but not eradicate, to spend a great deal of money in planting material, which in other countries costs nearly nothing, and for this reason, second and later rattooning is not allowed, the latter bringing the greater profits in other countries. In some countries money is lost on planting, but made on rattoons, while in Java returns can only be calculated on from plant-cane.

It is evident, that in Java the most favorable conditions are not prevalent and that the only profitable factor is: plenty of cheap labor. This enables us to work intensively and to neutralize the different drawbacks by big production ; on the other hand, it is plain that other countries with scarce labor cannot apply our methods as they are. Our large production is only due to our using every effort to attain same. The time is past when one could live at ease and still make big money by the manufacture of sugar. We have to do our very best and account for everything and above all manage very economically, so as to lower the cost of production per acre and make a small profit by steadily increasing the output of the soil and of the mill.

I would like to state in a few words how this is obtained.

Suppose the factory is established, and by contracts has got control of the soil wanted; then the conclusion of the rice harvest is awaited with great impatience. Between two cane crops, as a rule, rice is harvested twice and between seasons beans and corn or other similar products are grown, but it is customary that immediately after the second rice crop the cane is planted.

Sept.-Nov., beans and corn.
Nov.-April, rice.
April-Nov., fallow; second crop, etc.
Nov.-April, rice.
April-Sept., after one year, cane.

While the rice cutters are still in the fields, a deep trench is dug around the field, so as to draw off the water. The soil has been saturated by water for months, all kinds of processes of decomposition have taken place and oxygen is entirely lacking. To make the soil fit for cane, it must be exposed to the sun and air. It is for this purpose the deep trench is dug to draw off the water and to supply the irrigating water later on. Then the field is divided in parcels of .175 or .146 acre =say 1-6 or 1-7 acre by furrows and then the plant-furrows are made. As a rule these are 30 ft. long over one foot deep and 4 to 5 feet apart. The width is one foot and the dug-out earth is heaped between the furrows. In some places, where the soil allows it, we plow first, then hoe the furrows. The field being *open*, it looks like a collection of long ranges of trenches exposed to the sun. It is not known what is going on during this process, but everyone knows that it is absolutely necessary for obtaining good results. The process is called "uitzuren." (to air the acid out.)

The wet clay dries out, pulverizes, assumes a lighter color and instead of a mass of wet, black blocks, one now sees a light gray powderlike soil. During the process of "uitzuren" all grass is carefully weeded, which is especially necessary as long as the cane is not high enough to give shade; in the latter case it suppresses the weeds. After the soil has been rested this way, for some time, the furrows are plowed once more and some of the dried earth on the sides is loosened; then the tops are planted in the furrows, in some cases even in plantholes.

The seed cane supply is also one of the many sorrows of the manager. In former years, before the sereh bothered us, cane tops were generally used for planting, but as this gave failures, the growing of seed cane in separate fields or gardens has been started and each year a greater or smaller part of the planting is changed. The expense incurred is extremely high all over Java. First, there is the price of the seed cane, $7.35 per ton, plus railroad freights. One can safely figure on requiring about 1.55 tons per acre and this costs on the field, cut, $11.39, to which must be added an average of $40.00 per wagon (of 8.72 tons), which is not too high, so a total cost of $19.40 per acre is arrived at for fields planting with such seed cane. As, however, a great part of the planting is done with cheaper produced seed cane, we can figure on an average cost of $2.94 per ton for seed cane. If this expense could only be abolished, we should be aided to a great extent, but as matters stand now, it does not look as if this will be accomplished.

Most of the factories are far from their seed cane fields and buy same from special seed cane growers. For this purpose regular inspection trips are made and large areas at high elevations in the Preanger, Buitenzorg and Malang districts are given up to this cultivation. As soon as seed cane is cut, its gin cannot be traced and as it has been proved that seed cane from second rattoons is more subject to sereh than plant seed cane, it is evident that a great deal of care is required to be sure of the proper supply. Besides this, there are a great many sales middlemen and this causes plenty of dissatisfaction, the more so as the seed cane business is a very delicate affair. The measures taken by the Government to stop irregularities did not prove a success. For factories having land in their immediate vicinity fit for growing seed cane, the conditions are far more favorable; they can lease the land and grow seed cane themselves for their own account and under their own management. They of course are sure of their supply and the expenses are less, the transportation being much less expensive on account of the shorter distance. At all events, the supply of seed cane is a matter of much worry and great expense, and we can readily understand that various ways are tried to get rid of the present system.

The question of foreign cane varieties stands foremost. The Cheribon cane was principally affected by the sereh. Other varieties were more or less subject to it, but the rich and heavy Cheribon cane was the species giving the best results and as the sereh affected it, pains were taken to find another variety showing the same good qualities and proof against the disease. Cane was being imported from everywhere and planted on a small scale and later on extensively. There have been planted:—Loether, Muntok, Fidji, Yellow Manila, Black Manila, Batjan, Borneo, etc., etc., but none of these has been able to press the Cheribon to the wall. The Cheribon cane thrives as well on heavy as on light soil, can stand drought as well as moisture, has a fair weight, a pure and easily worked juice and keeps good long after ripening. The other mentioned species did not unite these good qualities. Loether and Manila do not thrive on heavy soil; Muntok is very sensible to drought; Borneo is not sereh-proof, with the result that the new varieties were planted here and there, but did not make the Cheribon cane superfluous. All species degenerate in some way or other when planted from their own seed cane and show symptoms of disease or stagnation of growth, which is very annoying and causes more damage than is worth the saving on import seed cane. These varieties can be restored by seed cane fields, but this is an expensive business. The Fidji or Cannemorte is very heavy, but on moist soils it is not rich in sugar.

Apart from these imports of said species, it has been tried to select Cheribon cane, by taking only sturdy tops from a sugar field, so as to collect the best specimens by selection. It became impracticable to continue this process as the quantity of eligible cane decreased steadily, resulting in nil.

After the discovery of growing cane from seed (by sowing) expectations were high-pitched. As the sereh was ascribed by a great many to the weakening, caused by continual non-sexual generation, it was plain, that if this supposition was true, the sereh would not influence the fresh specimens raised from seed. This, however, proved not to be the case, as it was shown very soon, that same very often was subject as well to sereh. By scientific crossings of Wakker, Moquette and Bouricius a number of species were grown, that combined a great immunity towards sereh with heavy weight and high percentage of sugar. Of these for instance No. 100 has been adopted and some other numbers promise a great deal. In Kremboong only is cane seed to be found; the manager claims his plantation free from import. The results were splendid and the most sanguine expectations were cherished. A great many bought a couple of sample car loads of this kind, hoping to increase their orders later and then to get rid of all import; but it proved pretty soon, that these species were even far more sensible to influences of soil and climate than varieties from seed cane. In some places they were splendid, in others bad, and on an average poorer in yield. The enthusiasm for cane seed, exaggerated at the start, has quieted down to a great extent. Everyone must select from a number self cultivated seedlings to suit his soils and conditions and may then be successful, but to import seed cane from cane seeds at random may prove sorely disappointing.

A drawback of the mountain-seed cane is, besides its costliness, its sensibility to diseases; this seed cane is much softer than the regular cane-field seed cane and more subject to infection. The greater cutting surface is a splendid fostering place for parasites, for instance: Black rot, and as soon as this catches hold of the soft, watery seed, it penetrates so soon that the buds scarcely shoot before the young plant dies. This is fought with tar or bouillie bordelaise, but these preventives fail also once in a while. Besides this, the yellow stripe disease has come along with the mountain-seed cane. This is a mysterious disease, for which no cause has been discovered, nor any remedy found to cope with it. Its appearance dates from the seed cane fields in Malang (Eastern Java); in the leaves are many stripes, where no chlorophyl is formed, so that these spots do not assimilate and the plant suffers by it. Manuring with ammonia causes the stripes to apparently disappear, but this is only the result of the surrounding bulk of the leaves getting a darker green and the faded color produced by the disease becoming less visible. The disease is hereditary and seems infective; in appearance and spreading it resembles the mosaic-disease of tobacco, which has not been explained, notwithstanding hard work. It is supposed that cane from seed should be proof against this disease. However, this remains to be seen, as it has only been in use for such a short time, that all possibilities have not yet been gone through with.

The problem is to get rid of import, and I firmly believe, that even if this should prove practicable, the seed cane plantations will not be given up. Moquette, the apostle of sowing cane, keeps up his seed gardens in the low lands by cutting a part of a field and allowing it to grow up again. The benefit of this method is that planting and grinding can be kept separate. If one has to depend upon the cane to be ground, he cannot start planting before cutting cane. Should the new field be ready for planting and the old cane not yet ripe, one would have either to wait or to grind green cane. Furthermore it is necessary in some cases, that the cane stands longer, so as to get the highest percentage of sugar, but then the seed cane is dead. Should the field catch fire the seed cane cannot be used. So if the cane has to serve two purposes, i. e., as sugar and seed producer, one has to face every time the choice of favoring either the old or the new cane and ordinarily comes to the conclusion that is not very favorable for either party. In most cases it is preferable to spend more money and have better quality seed, leaving the cane on the field to secure a higher yield, instead of being economical and making less production. The great increase of production of recent years is to be attributed to a great extent to the far-carried separation between old and new planting.

The seed is stripped from leaves, cut, leaving 2 or 3 buds, and generally once more disinfected. Experience has taught that the highest (upper) buds sprout the first, the lower ones later. To secure a uniform plantation, the seeds are selected while being cut. The first, second and third are laid together in the nurseries, the lowest parts as well so as to watch the result obtained. By this selection all pieces shoot evenly and the irregular shooting of some plants prior to the others, thereby injuring same by shade, etc., is avoided. In the meantime at the sides of each class loose specimens are planted for future supply; in case of substituting plants that die or do not prosper the fresh plants used are of the same stage of development.

In planting the seeds are laid in the loosened soil with the buds on the sides and well watered. This is far better than irrigation by rain, as rain washes the loose earth from the sides and so covers the seed. After a shower all plants have to be cleaned. Every four or five days the plants are watered and as soon as they come up are inspected so as to discover any failures.

While planting, or later, fertilizer is applied. Much money is spent in fertilizing, an average of $11.40 per acre, more or less, but the manure account of each factory is a heavy one and it is of the greatest importance to regulate the manuring so that the plant may benefit by it in the best way. Especially in a country with heavy downpours and where lands are irrigated, great danger exists that a part of the expensive manure may be washed into the sea. The cane in Java is fertilized nearly exclusively with nitrogenous manure. Kali and phosphoric acid, are totally superfluous, proven by the numerous experiments made by the different stations. Once in a while European experts blame us for too one-sided manuring and say that this causes various diseases, but if year after year the experiments demonstrate that only nitrogen increases the yield and that addition of other substances has neither quantitative nor qualitative influence upon the cane, we will stick to it and endeavor to ascertain in what way, in what form and in what quantity nitrogen gives the best results. It must not be lost sight of however, that I am only speaking of Java, where cane is cultivated on rice lands, which are flooded every year and so are covered with a layer of fertile mud. The decomposition is also very great, which has been shown by experiments, so that a great many mineral matters, valuable as plant food, become available during the process of uitzuren (the land being fallow.)

Manures:—Boengkil, i. e., pressed cakes of peanuts, seed of kapok or ricinus, and especially sulphuric ammonia. The nitrogen in ammonia is much cheaper than in other organic manures, but nevertheless many planters prefer a preliminary manuring therewith. The nitrogen dissolves only gradually and that is why the plant has a constant supply of this material for a long time, while in applying ammonia the nitrogen comes all at once. Experiments did not show this, but experience has taught me, that a preliminary fertilizing with Boengkil on these lands is not to be despised.

While hilling up (see explanation at foot) sulphuric ammonia is given, either diluted or as powder, but the main point is that it gets under the ground and not on the top, as the active element ammonia can be eliminated by carbonic lime. It is very important that it stimulates the plant, the juice must run up and cannot do so in the plant in its present state; it so forces the buds to sprout and thus favors the stooling out. In consequence one can get along with less seed cane, but only if one is sure to have enough water to keep all alive until the first rains set in, otherwise all is in vain and the secondary sticks die. Besides the "craft-fertilizers" much has been talked lately of organic manures in connection with the dongkellan disease. During the last couple of years a new disease has scourged our plantations, one year more than another. This disease is characterized by premature and sudden dying off of the cane. In the first periods of its vegetation the cane grows luxuriously, then it stagnates all of a sudden and dies in the course of some days. This disease started in East Java, but now appears nearly everywhere and always with the same symptoms. Its name was chosen, because the lower part of the stick (dongkellan) is rotten while the upper part lives on the upper roots; a name afterwards adopted, being more appropriate, is *root-rot*. The parasite has not yet been discovered, the disease is not contagious and a diseased stick transplanted in sound soil recuperates. Upon investigation the roots prove to be affected and all experts agree that the roots suffer the most. All kinds of hypotheses have been put forward and great efforts are being made to escape the disease by alterations in tilling ad fertilizing, but without much result. The only result has been to limit the damage by inundating the field as soon as the symptoms become apparent, or otherwise to cut the field as soon as possible, so as to grind green cane rather than dead cane. One can imagine how much trouble it causes to direct the hauling one time in this, another time in that direction as soon as in one field or other the disease has been ascertained and every time in a new spot, so as to save the threatened field. Sometimes the spot is in the middle of a field, very hard to be reached, then a pathway has first to be cut so as to allow of transportation.

It has been discovered that a good physical condition of the soil promotes the development of the roots and in consequence the resistance against the disease. For this reason much has been talked about green manuring and stable manure, so as to improve the condition of the soil. This, however, is very true in theory, but the agrarian conditions are against a thorough improvement of the soil. Who will take the trouble and pay the expense to improve a soil leased only for one year and which one is not sure to get back again after three years. Furthermore the intervals between rice and cane are too short for applying green manure, and transporting same from one place to another is impracticable. Stable manure is very scarce; the Javanese do not gather it and if same should be bought by the companies from the native population, the article would be adulterated and mixed with sand to such an extent, that I fear that, however much benefit could be derived from organic manuring, our conditions do not favor its adoption.

As soon as the cane has grown somewhat, the pests arrive. We enumerate termites, borers, beetle larvae (grubs), beetles and mice. There are more of them, but relatively they do not do so much harm. The termites are only bothersome on dry lands and nothing can be done but to apply djarakboengkil (a Malayan word which cannot be translated). The beetles eat through the cane, whereas the larvae of the cockchafer-species eat the roots and cause much damage. Especially in the East these insects are incredibly numerous and great efforts are made to kill them. In the evening they sit on the branches of certain trees; blankets are spread out underneath, the trees shaken so that thousand of them are caught. Mice are very troublesome in dry years while there is no food in the rice fields, so they eat the cane, old as well as young. I have seen and heard mice in a cane field; it resembled the noise of falling cane as if the field was being cut. All experiments with mice-microbes have failed; it may be the mice in question were of an immune species, or that other reasons were at work; catching and poisoning them proved the best means, but a proper fighting of the pest could simply not be thought of. As soon as the rice fields are again planted the mice disappear. Locusts or grasshoppers that cause so much damage in other tropical countries, are not very noxious in Java; this is perhaps due to the absence of a desert where they can hatch so as to enable them to invade the plantations in large numbers. By far the most dangerous and pernicious enemies are the caterpillars and amongst them especially the borers. Leaf-eating caterpillars do not do much harm, but with the borers it is quite different.

Until now five species have been discovered, all having their own way of tackling the cane. There are some that deposit their eggs on the leaves in heaps or ranges, others deposit them separately. The young caterpillars hatch out and bore holes, sometimes through the enveloped leaves to the center of the shoot, sometimes along the stick. In all cases they ultimately arrive in the stick, where they change into a chrysalis and remain till they can fly out. As soon as the growing part (center of the shoot) is destroyed, the stick can not grow any further. Sometimes the buds under same burst and form new sticks, but these are generally affected as well. By their peculiar mode of living these caterpillars escape a great many enemies as birds, ants, ichneumons (caterpillar eater), etc., and are hard to catch. Their damage is not only the killing of the cane, but by making holes they open the way for infection of all kinds of parasites, as *red snot*, *ananas-disease*, etc. The fighting is carried on intensively by searching for the eggs and the cutting out of the affected sticks; as the leaves dry out the affected plants are easily discovered, they are cut out and the caterpillars taken off. So as not to kill the coming caterpillar eaters, the caterpillars are kept under gauze to prevent their escape, leaving, however, free passage for the caterpillar eaters. Premiums are paid for eggs and caterpillars, but one has to watch the skill of the Javanese who do not hesitate to deliver all sorts of other eggs, even artificial ones, so as to get the premium.

The cane having made its way through all these dangers and pests grows further and has to be hilled up (see explanation below). For this purpose the lowest part has to be carefully cleaned and earth is pressed against it, so that the cane which was originally planted in a furrow, stands finally on an elevation. This must be finished before the heavy rainstorms set in, so that the rain water can run along the cane as nothing is so injurious to cane as stagnant water.

This manipulation having been applied for the last time, generally in December or January, the skill of the planter is at an end and he has only to await what time and weather bring. Only in case of floods is any action necessary, otherwise waiting is the watchword. The cane grows very quickly, the fertilizer becomes active and it is a pleasure to see how quickly the plant comes up from the soil; sometimes the growth is so rapid, that the leaves have been supplanted by new ones forcing up from beneath, before they were allowed to fully unfold. The plant looks like a folded flag, and sometimes the leaves tear off, but that is not serious and soon the field looks like a dark green mass of leaves.

Finally the flower appears, which checks the growth. Before that time the hurricanes have gone over the cane and thrown same in big patches. It erects itself, but in the end the field looks like a big pell-mell of fallen sticks with leaves, in which walking is impossible.

It is now the easy time for the overseers. They get their vacation and at this time the yearly congresses are held. The weather has again improved and everyone gathers strength and courage for the coming grinding season.

The cane being ripe and the roads hard, so that the hauling is free from difficulties, the grinding starts. With the assistance of a native astrologer! or other person of authority a good day is fixed and the crop is started with more or less festivity. The native laborers of the mill are feasted and display marvels of eating capacity. All kinds of native entertainments are going on and last till daybreak. The invited Europeans assemble at the decorated mills, where for the prevention of mishaps, the heads of slaughtered oxen and goats are fixed, drink a bottle of champagne for good luck to the coming grinding season and as a token of their readiness to render assistance in case of need, put a stick into the mill. After this holiday a few days' rest is taken and then the grinding sets in. This is the busiest time of the year, night and day the mill is working. Sunday and working days are without relaxation, the factory works all the time so as to convert the constant flow of juice into sugar.

Cane must be supplied continuously, the manager must know which field is on the roll, direct the hauling and look out that there is no lack of cane. In ordinary cases this is very hard, the more so if difficulties arise. Sometimes foot and mouth diseases break out; cattle plague takes away a part of the hauling cattle, or heavy storms soak the ground and make it impossible to get through the mud with the heavy drays.

It is proper to mention here the terrible epidemic that visited Java and caused a panic in some districts.

Add to this a village feast or an election, so that from one village or another not a single laborer comes to work, or a bridge is washed away, thus barring the road, so it is evident that the question of transportation and supplying the mill is not an easy one.

Now it may be that through the dying of a field or a fire in the plantation, suddenly counter orders must be given and cane from other fields than originally directed must be hauled; these are all abundant reasons adding importance to the supply of material in a cane sugar factory, being far more troublesome and expensive than in a beet factory.

It is our aim to cut as much cane as possible that has reached the highest degree of ripeness, for which purpose on well managed estates all fields are tested from February at certain periods, but so many influences are there, which determine why a field, that was not yet to be cut, has at once to be dealt with, that this systematical investigation has not yet shown the good results that could be expected in an ideal case and which are realized more and more, as one masters these influences by good management and a thorough understanding of the business.

Apart from the supply of cane the regular working and shipping of the product, all kinds of questions have to be settled in the mill as well as in the fields.

Furthermore there may be machinery repairs or cane disease, that have to be provided for, or the juice is not as it ought to be and hard to work.

Finally the grinding season of one year coincides with the planting season of the other and to the hurry of the grinding is associated the preparing of the soil, supply of manure and seed cane, the planting, the water supply, etc., etc., so that the work does not relax one single moment. From early morn till late in the evening manager and staff are very busy; the report of the day's work is discussed and the plans for to-morrow arranged and very often the manager visits the buildings at night time to ascertain if all is going right. This is a nervous hustling time without intermission. Sundays or holidays are ignored and all efforts are directed on the early finish of the grinding season. Only one hour in the morning is given up to cleaning.

The cane is being cut in the fields; the cane cutting overseer distributes the work and the coolies dig the sticks out. As the cane had been hilled up, often a piece of 1½′ to 2′ in length is buried and as it contains sugar has to be harvested. In some regions the lower part is dug out and the stick torn out; in others the cane is cut and a second gang of laborers dig out the lower part. This has the drawback that when the mandoers (lunas) have a contract for cutting cane, it becomes too expensive, as the digging of the cane is better paid than cutting and by cutting high a greater under part is left, in consequence more money is earned by the cutters. Now the cane is cleaned, leaves taken off, which are used as feed and taken away by the Javanese without charge, the cane is loaded on cars or carts and transported to the mill. As far as possible care is taken to cut just as much as can be handled in one day, as it is proven that cut cane in the fields deteriorates very easily and a mistake makes itself readily felt. In former years all cane was hauled in wagons, but owing to the extension of the estates this is not practicable any more, and much cane is now hauled in tram cars with animal or steam traction. A firm permanent roadbed on the roads with side lines is used. Even in this case the carts cannot be dispensed with and are kept to reach spots where cane has to be cut at once. The cane is stowed away or ground upon arrival.

Most factories have triple milling, with maceration, and sometimes with cane preparing machinery such as crushers, cutters, etc. A few years ago double crushing was generally used, but now triple, sometimes with maceration of the juice from the last mill. In the latter instance, the cane is first ground, then macerated with juice from the third mill, crushed once more, then macerated with water and crushed for a third time. The bagasse is burned without being dried. The juice from the last mill goes on to the first, that of the first and second goes to the boiling house. In this way the maceration water properly serves twice, first as water and afterwards as diluted juice. An important point is to see that the first mill crushes the cane thoroughly. If this is not done, the juice from the third mill will not properly penetrate the bagasse from the first mill, and the subsequent maceration water on the second mill would not have the proper penetrating and diluting effect. Diffusion is not applied at present except in one factory, but it is probable that we shall hear more about extraction of the bagasse as practical experiments have shown good results. The juice is mixed with lime, by defecation if a little is applied, and if much is used, the superfluous lime is eliminated by carbonatation. The juice is clarified by settling and filtration, evaporated in vacuum evaporators, once more settled and finally concentrated to masse-cuite in vacuum pans. Formerly second products were made from the molasses but now the molasses are mostly brought back into the masse-cuite and in this way nearly all sugar is made in *one process* and *one product*. Sometimes the molasses is boiled in and a low grade sugar made, but in many cases waste molasses is obtained in one operation. The high grade sugar is dried, packed in bamboo baskets lined with palm leaves, containing up to 700 lbs., the low grade sugar is packed in baskets of palm leaves, containing 102 lbs., and the waste molasses is thrown away. Sometimes it is sold to arak distillers, or used as manure, but mostly thrown away.

During the whole process of manufacture the cane and juice are sampled and analyzed; the control of the manufacture in Java is strictly maintained and that is why we are able to obtain a great quantity of reliable data. Some average figures may be given here:—As an average the cane in Java yields 13-14% sucrose, of which about 90% is extracted in the juice and 10% remains in the bagasse and is burnt. The quantity of product that can be recovered from this sugar available in the juice depends chiefly upon the purity of the juice and of course on the grade of sugar that is to be manufactured. As an average the loss of sucrose in molasses can be estimated at 10%, add to this the loss in press cakes and unknown losses, so we could say that 20-22% of the sucrose in the cane is wasted. These are serious losses and it would be well worth while if they could be recovered. The loss in bagasse is decreasing continuously by installing better mills and rational working methods and should one of the processes of diffusion now being experimented with prove practicable, much would be gained and half of the losses prevented. Of the other half lost in waste molasses not much can be obtained. What are we going to do with it? To make alcohol is easy enough, but the market is too limited to absorb the production; it has no future as feed or as fuel. The best thing to do will be to sell the waste molasses. As compared to beet molasses that of cane is tasty and masse-cuite can be consumed as it is. Now it is very easy to make sugar for consumption in a rational way and by preference in factories that work bad juice and in manufacturing white sugar throw away great quantities of molasses. It has been the case, that on 100 sugar 40 molasses were made containing 60 % saccharose, a total loss. The making of sugar for direct consumption on a large scale is possible if there is a market for it and then another source of loss would disappear. The other losses are unimportant and the reproach sometimes made that we work very carelessly is not deserved, because great pains are taken to work economically and if we succeed in producing a fair yield, it is not due to a luxurious nature throwing gifts in our lap, but because every effort is used in practice aided by science to locate all causes of loss and increase the yield per square unit. Finally some figures:—

In Java are working 182 sugar companies tilling:—

Year		Gross Acres	Net Acres
1898	100%	198,513	176,669
1899	104%	206,272	183,622
1900	113%	224,305	200,425
1901	127%	251,286	223,443
1902	129%	254,105	226,469

The great increase from 1899 to 1901 is due to the law regulating the maximum planting area. Without special permit this maximum cannot be exceeded and as this was known beforehand the companies planted as much as possible and thus the planting area was considerably extended. Now as this incentive does not exist any more the further increase will not be so very great and we have reached a certain level which is also shown in a calculation by Dieckoff estimating the area under cane for crop 1903, same not being greater than 1902. Further increase can only be expected from irrigation as in Brebes and the Solo-valley (Governmental enterprises), and from taking more indigo land under cane.

The yield of cane and sugar has been as follows:—

Year	Tons Cane Per Gross Acre	Tons Sugar Per Gross Acre	Net %
1894	30.36	3.32	10.36
1895	34.48	3.52	9.79
1896	30.63	3.37	10,55
1897	33.97	3.54	10.06
1898	39.25	4.12	10.21
1899	36.85	4.14	10.91
1900	38.01	3.73	9.57
1901	34.48	3.58	10.16

Disregarding fluctuations due to meterological influence, a steady increase of cane and sugar production per square unit is ascertained.

Sugar was sent to the following markets (expressed in per cent):

	1898	1899	1900	1901
Holland		0.7	0.5)	0.6
United Kingdom	4	0.2	0.3)	
Azores	1.4	--.--	--.--	--.--
Port Said	5.7	1.5	0.8	26.3
Delaware Breakwater	12.0	1.3	--.--	15.5
Barbados	2.6	2.6	--.--	1.2
Canada	0.4	--.--	--.--	2.--
United States	44.8	65.3	54.--	0.8
Australia	0.4	1.8	10.7	12.--
China	21.3	19.--	20.3	27.2
Japan	3.--	3.2	5.3	7.4
British India	1.4	1.1	3.8	3.--
Singapore	3.--	3.3	5.3	4.--
	100.--	100.--	100.--	100.--

The largest markets are the United States, China, Australia and Japan. Only little is shipped to Europe. It is to be feared that the American market may be lost, on account of the greater development of Cuba, but till now this fear has not materialized, as in 1902 large quantities went to the States.

The production of Java increases as well, viz:

1899	1900	1901
809,594 tons	795,688 tons	859,166 tons

The cost price of sugar after calculations of Mr. van den Berg was as follows:—

		Am. cts. per lb.	
$48.01 per ton (2000 lbs)	1885	2.39	without interest on capital or bonded indebtedness.
$45.36 " "	1886	2.27	
$39.25 " "	1887	1.96	
$39.19 " "	1888	1.96	

Figuring on $5.16 per ton for interest, the cost price for 1888 can be assumed to be $44.35 per ton. Mr. Engelberts searched and scrutinized the figures of above years and gets, basing his calculations on figures of 111 factories or 60% of the total, with 533,400 tons, 67% of the total tons grown on 136,408 gross acres, or 61% of the total acreage, the following data for 1900.

	Throughout Java.	Factories Investigated.
Number factories	185	111
Tons cane per gross acres ...	38.0	40.9
Tons sugar per gross acres...	3.73	7.47

so the factories that furnished data were of the best and even then the sugar cost including all expenses of management, planting, manufacture, transportation to the sea-port, keeping in repair of buildings, machinery, interest on working capital, commission on sale of product $33.14 per ton. Not included are expenses for new machinery, for extension of factory, new installations, purchase of transport-material for hauling cane, and the interest on capital stock and bonds. In 1900 the circumstances were not very favorable on account of wet seasons, but 1901 and 1902 were not much better. Assuming with Mr. van den Berg, $5.16 per ton for interest on capital, the cost is $38.30 per ton. There are of course factories that work at less cost, but others have more. Where the price is $35.25 per ton prospects are not very bright, the more so as we have cultivation under own management and so we cannot make the farmer pay as is the case in Europe.

Mr. van den Berg believed in 1888, that with these average figures the limit was reached and that economizing could not be carried any further, unless science should indicate means to secure higher yield of the fields, by installing improved machinery and adopting well tested methods of cultivation. He has been a true prophet, as the cost did not decrease by economy but only by increased production.

Where in 1888 the average of 3.1 tons per acre could be assumed, costing 3.1×\$44.35=\$137.48, in 1900 3.88 tons per acre were made, costing 3.88×\$38.30=\$148.60, so there is a decided improvement in cultivation and the cost price has not been cut down by economy and exhaustion.

What part of this cost price falls to the Javanese is hard to determine. Homan v. d. Heide calculates a very small amount; Van Hinloopen Laberton names a large amount; neither of these calculations are based upon a series of facts, but on single cases. Mr. Engelberts, who investigated the matter, does not like as yet to give his opinion as he does not care to draw a conclusion from the data of only 15 factories. It is certain, however, that the Javanese gets the bulk without risk and the company with great risk has to be satisfied with the smaller share.

From the figures of Mr. H. S' Jacob the average cost price of 42 factories over three years is as follows:

1899	\$32.30 per ton.
1900	36.84
1901	37.72
1902	32.84

which includes interest on working capital, but neither interest nor depreciation of the capital stock; for a complete calculation this has to be added.

The following specification of expenses shows the part falling to the native; same has been estimated too low, as the greater part of the money earned by the staff in salary and dividends (tantiemes) lands in the hands of the natives:

	Cost per Ton Sugar	Proportion of Same Falling to Native
Staff	\$ 2.94	......
Cultivation	11.74	\$ 8.81
Hauling cane	3.53	3.53
Fuel	.41	.41
Wages	.82	.82
Sundry requirements	.41	.41
Packing (Emballage)	.94	.94
Shipping	1.82	......
Keeping up	1.88	......
Sundry disbursements	1.00	1.00
Tantiemes	1.59	......
New Machinery	3.47	......
Interest	1.76	......
	\$32.31	\$15.92

According to Mr. H. S' Jacob $100,000.00 for each factory comes into the hands of the population, which corresponds with the above mentioned $15.92 per ton.

Recapitulation:—The improvements in cultivation and manufacture are as follows:

Division of cane raising, on the one hand sturdy plant material, on the other fully developed and ripe cane.

Better fighting of plant diseases and pests.

Quicker transportation preventing deterioration.

Rational investigation of the fields to be ground, so as to cut every field or part thereof at the most favorable moment, as far as practicable.

Better mills and other installations.

Improved control in the factory.

Quicker handling of the crop.

Railroad transportation, furnaces for undried bagasse, sugar dryers rendering the manufacture independent of the weather.

What is to be expected:

A better species of cane. With beets surprising results have been obtained by selection, etc., and it would help us to a great extent, if the same could be applied to cane, but for the present not very much has been achieved in this respect. Notwithstanding the great improvements in manufacture the yield of sugar from cane did not materially increase, which goes to show that the percentage of sugar in the cane is rather lower than before. It is not an easy matter to increase the percentage of sugar in the non-sexual way; seed crossings are more frequent than bud-dittos, so more chance exists that, by sowing, species with a higher proportion of sugar might be obtained sooner than by seed cane; with beet one new specimen suffices to fill the requirements, as after one year thousands of young plants are available, with cane only a few.

There is more chance in chemical selection, but still progress is very slow. This also explains why the many experiments of Mr. J. D. Kobus did not yet show as good results as in the meantime have been obtained with beets.

It is fortunate that with cane, (the opposite as with beets) heavy and rich cane associate, so a simple selection is to take the heaviest plants, which have the greatest chance to be rich in sugar.

Should these expectations materialize, we may expect great things, as figures from Hawaii teach us, where on well irrigated soils under very favorable conditions even 7¾ tons sugar per acre were made on an acreage of 1052 acres of cane two years old. Until a few years ago 40 tons cane in Java per acre was exceptional, now it is common, and so progress will continue.

Exhaustion of the soil need not to be feared, because cane only draws very little from the soil, most from the air.

Should 10 per cent more be extracted from the cane and so the production raised by 10 per cent now being burnt and the sugar in the waste molasses made productive as feed, the cost price should still be reduced. This of course will take much time, care and work, and much has still to be changed before we can feel satisfied with the conditions and not look for any more improvements.

NOTE:—"Anaarden." This technical word is translated by "hilling-up." As this manipulation is not used here, it may be explained as follows: The seed cane is planted in furrows. From time to time, earth is heaped around the seed, then furrows are plowed between the planted rows, finally leaving the plants on top of the hills.

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RATIFICATION OF THE BRUSSELS CONVENTION.

All the European beet sugar exporting countries, with the exception of Russia, recently ratified the terms of the Brussels conference. Great Britain, at whose instigation the convention was held, agreed to abide by its provisions on the condition that she would not be bound to penalize any bounty-fed sugar from the British colonies. Several of these subscribing Governments, who have pledged themselves to govern their sugar industries along the economic lines as set down in the requirements of the Conference, that include the abolition of all bounties on sugar and which are to take effect the first of next September, and continue for the minimum period of five years, are already lamenting their having been forced to sign the agreement. France, for instance, now discovers that she cannot produce sugar near so cheaply as can Germany or Austria-Hungary, and forsees that her sugar now mostly sold to Great Britain will be unable to hold that market. Again, the difference in cost of production will allow Germany and Austria-Hungary to even sell their sugar in France cheaper than that country is able to dispose of it herself when the consumption tax is reduced as agreed on. How grave the sugar situation in the French republic is may be seen when it is mentioned that last year France produced something over 1,000,000 tons sugar, yet the home consumption was considerably less than half that amount. It certainly looks as though Germany, with her production of about 2,300,000 tons annually, which can be made, it is stated, for $1 less per 100 kilograms (220 pounds) than the sugar produced in France, will be able in time to reduce the sugar beet area in the latter country to such an extent as to make it insignificant as compared to its present magnitude.

The law of the survival of the fittest appears well adapted to the coming sugar changes in Europe, for the provisions of the Brussels convention seem to point to increased per capita home consumption, decrease in production and American exportations and at the same time keener competition for the control of the European markets.

That Russia, the obstinate, who has refused to sign the articles drawn up in Brussels on the plea that her system of encouraging sugar exports is not a bounty or its equivalent, will be forced by the other powers to come to terms seems assured. Russia's system of fostering sugar exports was declared by the United States Supreme Court last January to be in effect a bounty, and therefore coming within the provisions of the Dingley Bill. This view, it is confidently expected, will also be taken by the International Commission that is to meet and take up the subject and Russia will then, too, join with the allied European countries and abide by the terms of the Conference.

The benefits the American sugar producers are expected to receive through the living up to the Brussels Conference have already been pointed out in the columns of this paper, and with the assurance that European countries will ere the end of the year be conducting their sugar affairs in agreement with its provisions, much gratification is felt. The advent of September the first will mark the beginning of a new era in the sugar affairs of the world, during which many continental sugar developments of interests may be noted. —Sugar Planters' Journal.

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FLUCTUATIONS IN SUGAR PRICES, MARCH 11 TO APRIL 11.

Centrifugals				Beets			
1903		1902		1903		1902	
March 11..	3.765	March 10 .	3.375	March 11	8s 5¼d	March 10	7s 6 d
" 12..	3.755						
" 16..	3.724			" 16	8s 4¼d		
" 17..	3.73	" 17..	3.41			" 17	7s 3 d
" 20..	3.695						
" 21..	3.70			" 23	8s 3¾d		
" 25..	3.695	" 24..	3.50	" 25	8s 2¼d	" 24	7s 5¼d
" 26..	3.627			" 26	8s 3 d		
" 27..	3.63			" 27	8s 2¼d		
" 28..	3.625	" 31..	3.625	April 1..	8s 1½d	" 31	7s 6 d
April 1....	3.60			" 2..	8s 2¼d		
" 2....	3.56						
" 4....	3.53						
" 6....	3.51						
" 7....	3.50	April 7.....	3.50	" 8...	8s 3 d	April 7...	7s 5¼d
" 9....	3.51						

TABLE OF BEET EQUIVALENTS BASED ON CALCULATIONS.

Beets F.O.B.	96 Test Cents.	Beets F.O.B.	96 Test Cents.
7s	3.71	8s 10 1-2d	4.12
7s 1 1-2d	3.74	9s	4.15
7s 3d	3.77	9s 1 1-2d	4.18
7s 4 1-2d	3.79	9s 3d	4.20
7s 6d	3.82	9s 4 1-2d	4.23
7s 7 1-2d	3.85	9s 6d	4.26
7s 9d	3.88	9s 7 1-2d	4.28
7s 10 1-2d	3.90	9s 9d	4.31
8s	3.93	9s 10 1-2d	4.34
8s 1 1-2d	3.96	10s	4.37
8s 2 1-4d	3.99	10s 1 1-2d	4.39
8s 3 3-4d	4.00	10s 3d	4.42
8s 4 1-2d	4.01	10s 4 1-2d	4.45
8s 6d	4.04	10s 6d	4.48
8s 7 1-2d	4.07	10s 7 1-2d	4.50
8s 9d	4.09		

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SUGAR REFINING IN JAPAN.

The advance sheets of consular reports, March 16, give an interesting report on the sugar industry in Japan, by E. C. Bellows, consul-general:

Sugar has been produced in Japan from very early times (since about 900 A. D., it is said), but formerly the sugar was used without being refined, and the present conditions of the industry have developed within the last thirty years. The climate, even in the southern part of the Japanese group, is too cold for sugar cane to grow throughout the year and it not blossom within the six months suitable for growth, nor does not blossom within the six months suitable for growth, nor does it produce sugar in such abundance as when raised under more favorable conditions. The annual production, exclusive of Formosa, is now reported at a little less than 4,000 tons, almost a negligible quantity in view of the importation of 152,000 tons of raw sugar and 176,000 tons of refined.

There are many sugar refining companies in Japan, most of them situated in the southern part of the islands, the total capital invested in this industry being about 10,000,000 yen ($5,000,000). Except in Formosa—which, although now a part of the Japanese Empire, has separate officers and laws—the industry receives no direct aid from the government, and has been very unfavorably affected by the bounty system in vogue in Europe.

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200 In 1901 the average import price of refined sugar was 95 cents per hundredweight higher than that of the unrefined, and the duty on refined up to No. 20 Dutch standard was 49.5 cents per hundredweight more than on unrefined. On upward of No. 20 Dutch standard the duty was 60.7 cents more than on unrefined, making a difference of $1.445 and $1.557 per hundredweight, respectively, on these grades, to cover the working expenses and profits of the Japanese refineries. The tariff on the unrefined sugar has since been raised and that on the higher grades has been decreased, so that the refineries now have less protection than formerly.

Besides the above duties, a law was passed last year providing for an internal revenue or consumption tax on sugar, as follows:

Below No. 8	$0.375
No. 8 to No. 15	.60
No. 15 to No. 20	.825
No. 20 and above	1.05

The numbers refer to the Dutch standard in color, and the amount of duty is given per hundredweight. Sugar, molasses, or syrup, taken delivery of from a manufactory, the customs, or a bonded warehouse, is subject to this duty, unless intended for export or manufacture. If so intended, it must be exported or manufactured within six months after delivery is taken, or the tax becomes due as if intended for consumption.

This law did not go into effect until more than six months after it was enacted, and consequently large importations of sugar were made in anticipation; but the refineries were unable to hasten their deliveries, and when the law came into force they found themselves obliged to pay the consumption tax and, at the same time, to sell in competition with imported sugars which had escaped this impost. The serious losses resulting have been very discouraging to them.

The Japan Sugar Refining Company produces sugar which stands as high as No. 25 Dutch standard, and manufactures rum as a by-product. The company claims to be the only distiller of rum in this country.

The greater part of the refined sugar imported is brought from Hongkong and Germany, and that from the latter country pays a conventional tariff of 28 cents on sugar from No. 15 to No. 20, inclusive, and 31 cents on sugar above the latter grade, Dutch standard, in addition to the general tariff named above. The Philippine Islands, Hongkong, Dutch India, China and Germany furnish most of the unrefined sugar, the countries being here named in the order of their importance with reference to this import.